

## PATENT COOPERATION TREATY

## PCT

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

REC'D 06 MAY 2006

INFO

PCT

Applicant's or agent's file reference 206,610-PCT	<b>FOR FURTHER ACTION</b>		See Form PCT/IPEA/416
International application No. PCT/US04/44048	International filing date (day/month/year) 29 December 2004 (29.12.2004)	Priority date (day/month/year) 31 December 2003 (31.12.2003)	
International Patent Classification (IPC) or national classification and IPC IPC: G01N 33/38( 2006.01);G01B 5/30( 2006.01);21/32( 2006.01);G01F 17/00( 2006.01) USPC: 73/64.41,149,429,865.6;249/78,82,158;264/40.5;374/55,56			
Applicant SAUDI ARABIAN OIL COMPANY			
<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of <u>3</u> sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input type="checkbox"/> (sent to the applicant and to the International Bureau) a total of _____ sheets, as follows:</p> <p style="margin-left: 40px;"><input type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p style="margin-left: 40px;"><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> <p>b. <input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) _____, containing a sequence listing and/or tables related thereto, in electronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p>			
<p>4. This report contains indications relating to the following items:</p> <p><input checked="" type="checkbox"/> Box No. I Basis of the report</p> <p><input type="checkbox"/> Box No. II Priority</p> <p><input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p><input type="checkbox"/> Box No. IV Lack of unity of invention</p> <p><input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p><input type="checkbox"/> Box No. VI Certain documents cited</p> <p><input type="checkbox"/> Box No. VII Certain defects in the international application</p> <p><input type="checkbox"/> Box No. VIII Certain observations on the international application</p>			
Date of submission of the demand 13 July 2005 (13.07.2005)		Date of completion of this report 07 April 2006 (07.04.2006)	
Name and mailing address of the IPEA/ US Mail Stop PCT, Attn: IPEA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (571) 273-3201		Authorized officer <i>Lydia Sue For</i> David A. Rogers Telephone No. (571) 272-1750	

Form PCT/IPEA/409 (cover sheet)(April 2005)

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/US04/44048

## Box No. I Basis of the report

1. With regard to the
- language**
- , this report is based on:

- ☒ the international application in the language in which it was filed.
- ☐ a translation of the international application into English, which is the language of a translation furnished for the purposes of:
- ☐ international search (under Rules 12.3 and 23.1(b))
- ☐ publication of the international application (under Rule 12.4(a))
- ☐ international preliminary examination (under Rules 55.2(a) and/or 55.3(a))

2. With regard to the
- elements**
- of the international application, this report is based on (
- replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report*
- ):

- ☒ the international application as originally filed/furnished
- ☒ the description:
- pages 1-25 as originally filed/furnished
- pages\* NONE received by this Authority on \_\_\_\_\_
- pages\* NONE received by this Authority on \_\_\_\_\_
- ☒ the claims:
- pages 26-30 as originally filed/furnished
- pages\* NONE as amended (together with any statement) under Article 19
- pages\* NONE received by this Authority on \_\_\_\_\_
- pages\* NONE received by this Authority on \_\_\_\_\_
- ☒ the drawings:
- pages 1/8 -8/8 as originally filed/furnished
- pages\* NONE received by this Authority on \_\_\_\_\_
- pages\* NONE received by this Authority on \_\_\_\_\_
- ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing.

- 3.
- ☒
- The amendments have resulted in the cancellation of:

- ☒ the description, pages NONE
- ☒ the claims, Nos. NONE
- ☒ the drawings, sheets/figs NONE
- ☒ the sequence listing (*specify*): NONE
- ☒ any table(s) related to the sequence listing (*specify*): NONE

- 4.
- ☐
- This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

- ☐ the description, pages \_\_\_\_\_
- ☐ the claims, Nos. \_\_\_\_\_
- ☐ the drawings, sheets/figs \_\_\_\_\_
- ☐ the sequence listing (*specify*): \_\_\_\_\_
- ☐ any table(s) related to the sequence listing (*specify*): \_\_\_\_\_

\* If item 4 applies, some or all of those sheets may be marked "superseded."

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.  
PCT/US04/44048**Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

## 1. Statement

Novelty (N)	Claims <u>1-24</u>	YES
	Claims <u>NONE</u>	NO
Inventive Step (IS)	Claims <u>1-24</u>	YES
	Claims <u>NONE</u>	NO
Industrial Applicability (IA)	Claims <u>1-24</u>	YES
	Claims <u>NONE</u>	NO

## 2. Citations and Explanations (Rule 70.7)

Claims 1-24 meet the criteria set out in PCT Article 33(2)-(3), because the prior art does not teach or fairly suggest forming of a second chamber relative to the location of a piston that is pressurized. For example, Gofrani *et al.* teaches a device utilizing a piston in device for monitoring the expansion or shrinkage of cement under simulated downhole conditions. Go Boncan also teaches that it is known to pressurize a vessel for monitoring the expansion or shrinkage of cement subjected to downhole conditions. None of the references teach or suggest pressurizing the piston to simulate the downhole pressures.

Claims 1-24 meet the criteria set out in PCT Article 33(4), and thus meet industrial applicability because the subject matter claimed can be made or used in industry.

## ----- NEW CITATIONS -----

U.S. 2,978,781 A (SHUMAN) 11 April 1961  
U.S. 3,239,880 A (OXEL) 15 March 1966  
U.S. 3,574,281 A (CASEY) 13 April 1969  
U.S. 3,779,085 A (RICE) 18 December 1973  
U.S. 4,122,704 A (LUTENEGGER *et al.*) 32 October 1978  
U.S. 4,408,489 A (SPANGLE) 11 October 1983  
U.S. 4,491,017 A (IYER) 01 January 1985  
U.S. 5,009,512 A (LESSI *et al.*) 23 April 1991  
U.S. 5,487,307 A (LANDGREN *et al.*) 30 January 1996  
U.S. 5,741,971 A (LACY) 21 April 1998  
U.S. 6,070,465 A (MAKI, JR.) 06 June 2000  
U.S. 6,817,238 B2 (GO BONCAN *et al.*) 16 November 2004

CHENEVERT *et al.*, "Chemical Shrinkage Properties of Oilfield Cements" Drilling Engineering, March 1991, pages 37-43.

GOFRANI *et al.*, "CaO- and/or MgO-Swelling Cements: A Key for Providing a Better Annular Sealing?", SPE/IADC Drilling Conference, February 1993, pages 199-214.

BEIRUTE *et al.*, "Expansive and Shrinkage Characteristics of Cements Under Actual Well Conditions", Journal of Petroleum Technology, August 1973, pages 905-909.

BEIRUTE, "True Expansive Characteristics of Commercially Available Expansive Cement Under Actual Well Conditions", SPE Annual Technical Conference and Exhibition, October 1976, pages 1-8.